PS Irradiations for Pixel Electronics

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Summary of PS Schedule:

- Available Periods this Year

Proposed Irradiation Program:

- Analog Test Chip + PM Bar
- MCC-D0

Irradiation Periods at PS

Present Schedule for LHC Irradiation Periods (ATLAS+CMS):

- Mon 10 Apr at 8h to Mon 1 May at 8h(16d+16h)
- Mon 22 May at 8h to Sun 4 Jun at 0h(12d+16h)
- Mon 19 Jun at 8h to Mon 17 Jul at 8h (28d+0h)
- Mon 17 Jul at 8h to Mon 14 Aug at 8h (28d+0h)
- Mon 14 Aug at 8h to Sun 10 Sep at 0h(26d+16h)
- Mon 9 Oct at 8h to Mon 13 Nov at 8h (35d+0h)

Original Plan:

- Would begin significant irradiations of FE-D in April period, to have assemblies ready for May H8 running.

New Proposal:

- Prepare Analog Test chips and PM bars for irradiation in April period. This requires some simple PC boards to allow PM bars to be biassed for worst case (transistors with field across gate oxide), and Analog Test chip to operate in a standard way. Material like Au should be minimized (prefer non-packaged parts).
- Similar preparations needed for MCC-D0 (it should at least be clocked).

Operation:

- Prefer that we can make some measurements during irradiation. This is particularly useful when devices fail...
- For FE-D, this was carefully planned, using rad-hard support card, etc. We should work on simpler, but similar, test arrangements for the chips we want to test in April.

Doses:

- Pixel lifetime dose now estimated to be 50MRad. DMILL is only qualified to 10MRad during production.
- SCT and others have significant experience up to 10MRad and 10^{14} n equivalent.
- Suggest that we irradiate devices to 10, 20, 30, and 50MRad in order to study evolution beyond the present knowledge. This corresponds approximately to total fluences of 4, 8, 12, and 20 x 10^{14} protons/cm^2